

THE HOME GARDEN



A Brief Discussion of Garden Soils and
How They Are Built Up, Together
With Suggestions For Growing
the More Common Vegeta-
bles. Also a Monthly
Planting Calendar.

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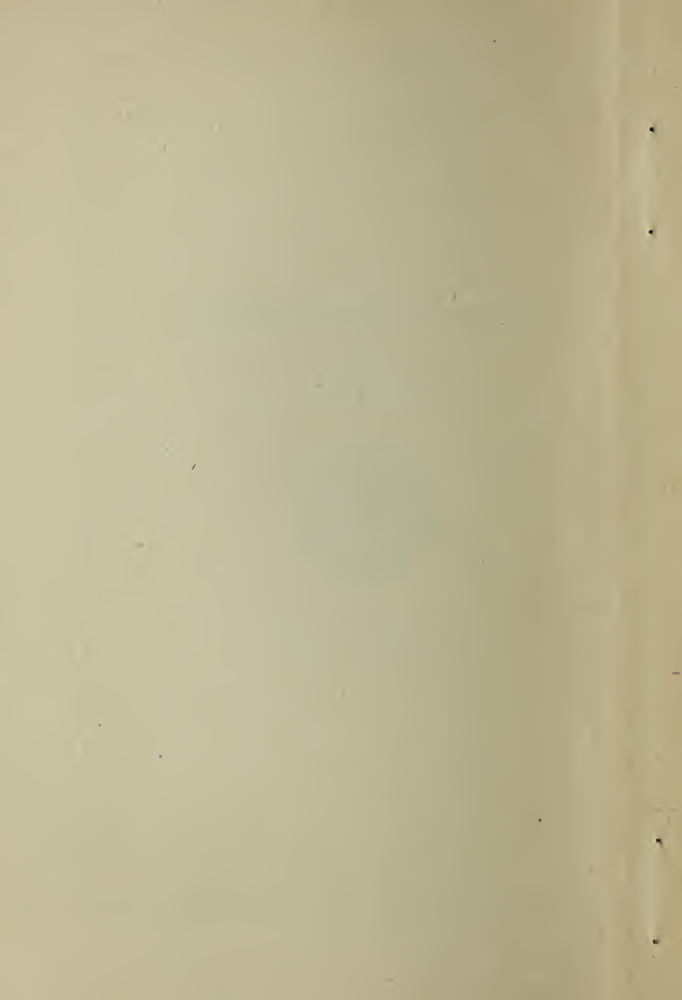
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Introduction

The home garden is so intimately associated with the well-being of the family that it becomes one of the important factors in the make-up of the establishment. The farmer looks upon the vegetable garden as a necessity, while the resident of city or town regards the first products from his little plot of ground in the backyard as luxuries which money will not buy. For all this, neither the farmer nor town resident is living up to his possibilities in providing his table with good things in and out of season.

It is a comparatively simple matter to grow things in season, but skill is required to grow them under artificial conditions. It is this last phase of gardening that is being given more and more attention as the people learn that by using simply constructed hotbeds it is possible to produce delicacies like lettuce, radishes, etc., very early in the spring or late in the fall, and sometimes during the winter at a trifling expense. The awakening in this direction is very wide and great, but judging from the number of inquiries received at the Experiment Station there are many who feel in need of some guidance in the way of plain, brief directions for growing garden vegetables for home use. It is the mission of this booklet to try to fill this want. No effort has been made to give directions in detail for growing the various crops, as such a discussion would quickly have led beyond the limits of this treatise.

No apology is necessary for occupying so much in the discussion of soils, as a good soil is the foundation of a good garden. Without the soil is right failure is almost sure. Fortunately the principal materials are always at hand for building up good

soils from uncongenial locations. The value of barnyard manures for this purpose can scarcely be overestimated. There is a popular misunderstanding in regard to what the average soils need to make them congenial for vegetable growing. While plant food, or actual fertility of soil, is necessary to a degree, it is of far more importance that it be porous and in good physical condition. Commercial fertilizers will supply fertility, but it is only by the addition of large quantities of vegetable fiber (humus) in the form of manures that the soil becomes porous, warm, quick and, at the same time, fertile. Other factors are aids in improving many soils, but it should always be remembered that the liberal use of barnyard manures is the most important.

The Home Garden

The Soil: In General—The first essential to success in the home vegetable garden is good soil. The soil must not only be rich, but it must be in a proper mechanical or physical condition. By this it is meant that it must be porous and well drained, so that it will warm up early in the spring; can be worked quickly after a rain, and will not bake and run together or crack open. The farmer can usually exercise considerable choice as to the location for a home garden, but in many instances, on account of the scarcity of land, or as a matter of convenience, it is necessary to locate the garden near the residence, regardless of whether the soil is the best or not. Under such circumstances it is quite possible to build up a favorable soil, even where the natural conditions are extremely bad. The soil building will consist of surface and tile drainage, if necessary; the addition of humus, or vegetable fiber, to the soil; and otherwise improving the physical make-up by

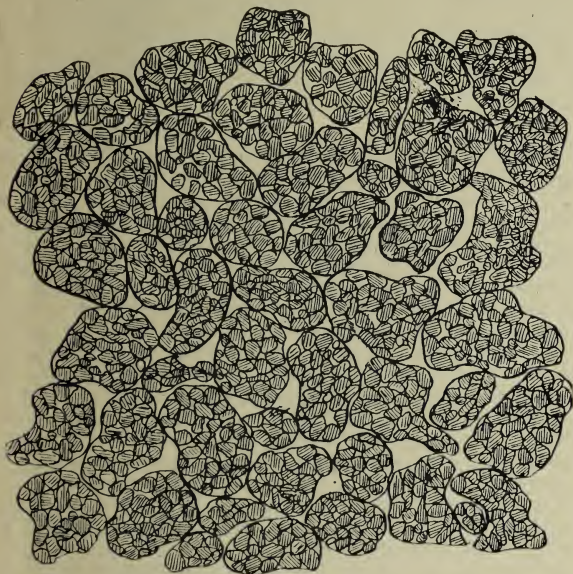


FIG 1.

FIG. 1. Soil much magnified. The large lumps in the illustration are the smallest parts of the soil we can see with the naked eye; when magnified, each lump is seen to consist of a large number of very small particles of irregular shapes and sizes. In a good soil, when moist, the roomy spaces between the large particles are occupied by air, while each of the very small particles is surrounded by a film of water which occupies most of the spaces between them. In a wet soil the large spaces are filled with water instead of air.

the addition of sand and manures. The addition of plant foods in the form of fertilizers is a secondary consideration, but these may also claim some attention. In order to intelligently begin the work of building up a good garden soil, it will be necessary to know something of the general make-up, or structure, of soils.

A handful of ordinary earth from a field or garden in a good state of tilth, will contain a great many things. In the first place, what is usually known as the soil itself, seems to be a black mass of particles of different sizes. Upon closer examination this mass will be found to consist of material much resembling crushed rock. If we take a very small amount of this material and place it under a microscope which magnifies two hundred or three hundred times, it will be found that what appeared to the naked eye as little lumps of "dirt" is, in reality, a collection of very fine particles of matter loosely stuck together, forming the supposed lumps. The interesting part of this last discovery lies in the fact that the small lumps visible to the naked eye are, in reality, a large collection of very small particles which, although they lie close together, have air spaces between them, because of their irregular shapes, as shown in Fig. 1.

Soil Water—When water falls upon the earth it is said to soak into the soil and disappear. Most farmers know that if the sub-soil is porous enough to allow water to pass through it, it will soon drain off after a rain, but if there be a layer of compact clay, known as "hard-pan," some distance below the surface, it is a matter of common experience that the soil soon becomes saturated and water stands in the soil or upon the surface, draining off very slowly. At this point it should be stated that the water is

able to gain an entrance into the soil by reason of the air spaces between the soil particles, as mentioned above. If the soil is in a water-logged condition it is because all of these air spaces are completely filled with the water. Under such condition the soil is said to be wet. When the soil is merely moist and in proper condition for growing crops and for being cultivated, the air spaces are not filled completely with the water, but each of the smaller particles of the soil is merely surrounded by an exceedingly thin film of the water. This may be illustrated by dipping a small stone in a cup of water. After shaking as much of the water off as can be removed in this manner, the stone is still seen to be moist, while no water can actually be seen to be standing upon it. Such a stone is merely surrounded by a film of water. In a fine soil there will be thousands of little particles in a single cubic inch of the earth, so that it is readily seen that if each one of the particles is surrounded by a film of water, such a soil is not at all wet, being merely moist. yet it contains in the aggregate a great deal of water. Many farmers' boys are familiar with the fact that a moist soil, which is in good working condition, can be taken up with the hand and by constantly rolling and pressing between the hands can be made wet, so that water will be quite noticeable on the surface. This is because the pressure has caused the fine particles to be forced closer together and the small amount of water adhering to each particle has crowded to the surface.

MAKE-UP OF SOILS AND SUB-SOILS.

Soils are usually classified according to the size of the particles of which they are made up, it being remembered that the particles consist of either sand

or clay, the former being composed of fragments of a very hard kind of rock (quartz) and the latter, being fine dust, resulting from the decomposition, or rotting, of other kinds of rock. This makes up what is known as the mineral part of the soil. All of the earthy matter except the surface layer which we cultivate, is of this nature, although there is, in addition to the sand and clay mentioned, varying amounts of fragments of rocks of different shapes and sizes, from the finest gravel to the largest boulders.

The surface layer of the soil is materially different from that below. It is usually much darker in color than the sub-soil; it is much looser and more porous than the clay beneath, and every farmer knows it is far richer. Both the color and the fertility of the top soil are due to the presence of decayed vegetable matter. Countless generations of vegetation have lived and died on our average soils and this decayed matter has formed what is known as **humus**. In nature, humus is formed rapidly in woodlands by the annual crop of decaying leaves, if fire is kept out. Humus also supplies fiber to the soil. This fiber is secured in garden soils by plowing under any kind of vegetation as rye, clover, manure, or the refuse of the garden. All of this decays and becomes humus. The humus improves the physical condition of the soil by making it loose, open and mellow; by enabling it to hold moisture; by preventing it from becoming compact and baking after rains. The humus itself contains a great deal of plant food. It also assists in converting the mineral matter of the clay and fragments of rock into plant food. The chief reason for the almost extravagant use of stable manures by market gardeners is the addition of humus. Lands which are thus manured year after year have a tendency to become well

drained, loose and warm. When fertilizers are added to such soil they act quickly. The land can be tilled at almost any time in the growing season and when one crop is off another can be put in immediately.

Drainage—Almost the first thing to be considered in building up an unfavorable soil is the matter of drainage. The best drainage is that which is provided by nature, which is a matter of slope and the character of the sub-soil, which will either hold the water or allow it to settle down quickly. There are two methods of draining the soil: First, by means of surface ditches; and, second, underdraining by the use of tiles. For temporary purposes, surface drainage may be used, or the land may be ridged so that the surface water is taken off in the dead furrows. This surface drainage, however, results only in carrying off superfluous water and does not have much effect on improving the land in the way in which underdrains do. Underdraining is practiced for two purposes—to carry off the water that stands in the soil, thus filling up all of the air spaces between the particles, and to improve the physical texture of the soil. All low and boggy lands need to be drained to get rid of the extra water. Very stiff clay lands, which are generally dry and hard, usually can be much improved in their grain, or texture, by a good system of underdrainage. The explanation is as follows: If water stands long in clay lands it tends to cause the soil to run together and become hard. If the superfluous water is quickly taken off, however, this cementing, or hardening, does not take place. The soil is thereby made looser, or in a better physical condition. This loose or friable condition of the soil enables it to hold more moisture than when it is hard and brick-like. For vegetable gardening purposes, particularly if quickest results are derived, it is necessary to underdrain hard clay

lands, even if they are not wet. It makes them workable early in the spring after rains, seeds germinate earlier and plants obtain a quicker foothold.

The depth of the drains and the distance apart will vary with the different soils. In general, the deeper the drains the deeper will be the effect on the soil and the greater the area which they drain. As a matter of practice, however, it is found that four feet is usually the greatest depth and three feet the least. Wet lands, or very hard clay lands, should have drains at a distance of not more than two or three rods, if the lands are to be put in the very best of condition for market gardening purposes.

The tiling should have a diameter of at least three inches on the inside, should be of the plain, unglazed kind, and in laying care should be exercised to see that there is a fall of at least one inch to the rod, but three to six inches would be better. The home garden will seldom be large enough in extent to necessitate having a main drain for the laterals to empty into.

Fall Plowing—It is a favorite practice with the gardener to plow land in the fall. Land which is plowed in the fall can nearly always be worked several days earlier than when plowed in the spring. It dries out sooner. If a heavy dressing of barnyard manure is turned under in the fall the weathering, freezing, thawing, etc., causes it to break down and decay. If the land is clean and in good condition it will not need to be plowed again in the spring but can be worked down with heavy tools like the spading harrow and be got in ideal condition.

Emphasis should be laid on the necessity for plowing the land deeply. The ordinary twelve-inch plow can be so adjusted as to cut a furrow from six

to ten inches deep and care should be taken to see that it does not feed into the land too far, thus preventing all of the soil from being cut and turned over. Lands may be worked earlier if they are thrown into beds or ridges by the fall plowing so that the dead furrows occur every eight or ten feet. The surface water is then carried off and the ridges lie so high that they dry out quickly.

Where lands are poorly drained by reason of their containing a high percentage of clay, thus causing them to bake, they may be materially improved by the addition of sand. By the use of both sand and barnyard manure in large quantities, extending over two or three seasons, it is possible to build up a fine garden soil out of land that was previously useless for that purpose. In adding manures to the soil it would be much better if the material is thoroughly rotted. It thereby becomes quickly mixed with the soil and its plant food can be immediately used by the plants.

Tillage—At the present time the great emphasis in good gardening is placed on tillage. There are two kinds of tillage; first, where we prepare the soil to receive the crop, and, second to maintain the soil in good condition for the growth of the crop. To prepare the soil for the crop the land should be loosened and pulverized as deeply as ordinary roots go. To maintain the soil in ideal condition for growing crops the surface should be tilled or stirred as often as it becomes crusted or compacted, which will nearly always be the case after each shower of rain. If the land is thoroughly tilled before any crops are planted a great deal of later work will be avoided. This is a fact often overlooked, but the observant farmer knows that if the land is stirred deeply and thoroughly pulverized previous to planting to any kind of cultivated crop that there is much less labor

involved in keeping down weeds during the growth of the crop. This is a considerable item, especially where very small plants, like onions from the seed, are grown.

The rainfall of the growing season is often insufficient for the crop; the plants draw on the moisture which has been stored in the soil by the winter rains and snows; therefore it is very important to save this supply of water and this is done by careful tillage at proper intervals to keep the surface finely pulverized, so as to prevent the evaporation of the moisture. A mulch made of fine dust is just as effective in keeping the soil moist as a mulch made of grass or straw. Even if some part of the land is not to be used until June it should be fitted early and lightly harrowed at frequent intervals until the crop is planted. If it is ever allowed to bake and crack open the moisture from below comes up and is quickly evaporated and lost.

Rotation of Crops—Land which receives identical treatment year by year, while it may be fertile enough in ordinary plant foods, tends to become unproductive and unsatisfactory. A rotation is useful because it gives different treatments to the land. Any fault of one year tending to be corrected by the management in another year. Furthermore, no one element of plant food is exhausted, the rotation tending to even up the demand on the soil by the different crops. Also, one kind of crop, as beans or peas, will leave the land in good physical condition for another kind of crop. Some crops demand different methods of cultivation from others and therefore have a tendency to destroy weeds and other pests. Finally a rotation of crops means a rotation in tillage, manuring and other treatment. Rotating crops is equivalent to resting the land, in

much the same manner that a person may become rested by changing work.

Fertilizing—A distinction is made between fertilizers and manures. A fertilizer does nothing but furnish plant food, while a manure may (and usually does) supply plant food and, in addition, greatly improves the texture or physical condition of the soil. When the soil has been thoroughly fitted, built up and improved, by the means mentioned, it is then time to think of adding plant food. This plant food may be supplied in the form of some concentrated fertilizer. It is also added when green crops are plowed under or when manure or compost (well rotted vegetable matter of any kind) is applied. From the foregoing it will be readily understood why the addition of commercial fertilizers even in bountiful amounts, may not insure the production of a satisfactory crop. Without the soil in a good physical condition plants cannot grow satisfactorily, no matter how much plant food there may be present. On the other hand, a soil that is built up by the addition of vegetable fiber in the form of manures or decayed vegetation, and by the addition of sand to further improve the drainage, while it may possess only moderate fertility, is in a good mechanical condition and crops will thrive in it. The best results are usually to be expected when there is something like a rotation in the fertilizing of the land, stable manures being used alternately with concentrated or commercial fertilizers.

The kind and amount of fertilizers to be used are to be determined by several circumstances. It should be remembered that there is no exact means by which one can determine what fertilizers he shall apply. A little experiment with different kinds of

fertilizers on two or three of the leading crops on one side of the garden is the readiest means of answering the question. It is the popular belief that a chemical analysis of a plant will tell exactly what fertilizers and what quantities it may require. Also that the chemist may analyze the soil and thereby determine whether the required fertilizers are present or not. Both of these assumptions, however, are incorrect. The chemical contents of plants vary in different seasons and in the different parts of the plant and also with the soil in which the plant grows. The plant may take up more than it needs when some element is abundant. By analyzing the soil the chemist can tell what is present, to be sure; but, owing to the fact that the plants cannot use any kind of food unless it is dissolved in water, the chemist has no means of telling us whether the foods he found in the soil were in a condition to be used by the plants or not. In making the analysis he has to dissolve everything in acids and therefore he has no means of knowing whether they could have dissolved in water. Another difficulty in giving advice for fertilizing land is the variable character of the soil. The sandier and more uniform the land the more marked, as a rule, will be the effect of commercial fertilizers. The harder the clay the less marked, in general, is the effect although the addition of lime may exert an influence in making such soils more porous.

Again, the state of tillage has much to do with the efficiency of the fertilizer. The element which the plant needs may often be afforded more cheaply by giving better tillage than by adding fertilizers, for tillage sets at work the forces of nature which unlock the plant food. On the other hand a fertilizer is more useable by plants on well tilled soil; the

plant can get hold of it, because the material is more easily distributed and there is more moisture in which it may dissolve. The good gardener is the one who gets the most out of his land by means of stable manures and good tillage and then adds a fertilizer to get more out of it. He uses fertilizer for the purpose of securing an extra yield rather than to prevent the soil from becoming exhausted. Fertilizer is usually a losing investment for a poor farmer or gardener.

As a rule most garden crops require a great deal of nitrogen. This is the fertilizing element that is most expensive when purchased and is the easiest lost when applied to the soil. Good commercial sources of nitrogen are nitrate of soda and sulphate of ammonia. This element is supplied to a considerable extent by the use of barnyard manure, or by growing leguminous crops, like peas, beans, clover, etc. The other two fertilizing elements which we expect to add to the soil are potash and phosphoric acid. The first is supplied commercially by muriate of potash and unleached wood ashes. The latter is secured by using bone compounds and fossil phosphates, as South Carolina and Florida rock. Of nitrate of soda, one hundred and fifty to three hundred pounds per acre is a good application. Of muriate of potash, from two hundred to four hundred pounds, and of acidulated South Carolina rock, from two hundred to four hundred pounds. It must be remembered that nitrogen, potash and phosphoric acid are found in a great many different materials, in which they will occur in varying quantities; but under our fertilizer laws each brand which is placed upon the market is accompanied by an official analysis showing the percentage of available fertilizing ingredients which it contains. From these data the farmer may compute the amount of each to

use on his land by making use of the following formula for garden crops:

Nitrogen, 4 per cent.

Phosphoric acid, 8 per cent.

Potash, 10 per cent.

LAYING OUT THE GARDEN.

The size of the garden and the relative amounts of the different crops grown must be regulated by the size of the family and their fondness for particular vegetables. An area 100x150 feet is generally sufficient to supply a family of five persons, not considering the winter supply of potatoes, but the area mentioned must be well tilled and handled. It is much easier to cultivate and manage the different crops when they are planted in long rows. The old practice of growing vegetables in beds usually calls for more labor and expense than the crop is worth. Even if the available area is only twenty feet wide the rows should run lengthwise the plot and be far enough apart (from one to two feet for small stuff) to allow of sufficient room for passing between the rows in gathering the product or for cultivating with hand wheel-hoes, if desired. If sufficient land is available for using a horse in the cultivation none of the rows should be less than thirty inches apart, and for large-growing things like cabbage, three to three and a half feet is better. If the rows are long it may be necessary to grow two or three kinds of vegetables in the same row. In this case it is important that vegetables requiring the same general treatment and similar length of season be grown together. One part of the garden plot should be set aside for growing crops that are somewhat alike; for example, all root crops might be grown on one side, all cabbage crops in the adjoining space, tomato,

egg plants and the like in the center, and all corn and other tall things on the opposite side. Those crops that continue to live for many years without replanting, like asparagus and rhubarb, should always be located at one side, where they will not interfere with the plowing and cultivation.

In a family garden of 100x150 feet, with the rows running the long way, eight or ten feet may be reserved on the borders for asparagus, rhubarb, sweet herbs, flowers and, possibly, a few berry bushes. A strip twenty feet wide might be used for vines, like cucumbers, melons and squashes. The remaining seventy feet will be room enough for twenty rows three and a half feet apart. This area is large enough to allow of good results in rotation and if it is properly managed should remain highly productive for a life time.

HOTBEDS AND COLDFRAMES.

Hotbeds are devices supplied with bottom heat from fermenting manure, or other sources, for the purpose of growing plants out of season, or for forcing them into a quick growth. More farmers, and even city residents, should learn to make use of the hotbed. A hotbed is made by digging a pit in the ground, 4x6 feet in size and 18 inches deep. Set a small post in each corner to which to attach the framework. In building a single bed, the long way should be north and south. The sides and ends are boxed up from the bottom with any kind of rough boards. If the soil be of a nature that is not likely to cave in on the sides, the board work may be only above ground. When completed, the cover for the bed should have a good slope toward the south in order to carry off rains or melting snow quickly. The north end of the frame should be at least twelve inches high and the sides eight inches.

The best cover is made by using a wooden framework, employing strips not over three inches wide, with narrow wooden strips about an inch thick, running lengthwise only. Panes of glass should be fitted into the grooved strips in such a way that they will lap over each other shingle fashion, the laps being only about a quarter of an inch. After danger of severe freezing is passed a much cheaper covering for the bed may be made by tacking to a board frame a sheet of thin cloth, which has been soaked in linseed oil. New domestic is good for this purpose. The cover should admit as much sunlight as possible, glass, of course, being the best. An oiled cloth also admits considerable light, will turn water and is inexpensive.

The hotbed pit should be filled with fresh manure from a horse barn, making sure that the material has not been exposed to the weather. The manure should be spread in the pit uniformly and firmed down well, taking care that all the corners are filled, otherwise the bed will be unevenly heated. Over the manure put a layer of rich soil five or six inches deep. This soil should be made of a mixture of one part good garden soil to two parts of a mixture of equal amounts of rotted sod, sand and thoroughly rotted manure. Water thoroughly, so that the manure is wet to the bottom. In four or five days the manure should begin to ferment and give off heat. If all goes well, the bed will become very hot, so that a thermometer to plunge in the soil would be very useful. When the temperature gets down to about 80 degrees the seeds or plants may be placed in the soil. In the latitude of Missouri a bed of this kind may be made in late February or March and vegetables like lettuce, radishes, etc., will be ready for table use by the time it will ordinarily do to sow the earliest seeds in the garden in spring.

The hotbed will require regular watering every day or two, depending upon the state of the weather. Also the growing plants must have an abundance of fresh air. Each day, about the middle of the forenoon, if the air is not cold enough to freeze the plants, one end of the sash should be propped up a few inches. See Fig. 2. On warm, sunny days the sash may be left up until the middle of the afternoon. If severely cold weather is expected at any time the outside of the frame should be banked up with manure or earth and the sash covered with manure, a board cover or a mat of some kind. The best location for a hotbed is on the south side of a building or high board fence, where it will receive the full benefit of the sun all day.

Hotbeds are perhaps most useful for starting plants early and afterwards transplanting them to the garden, although certain crops may be grown to maturity in them. Radishes may be made to grow to perfection in twenty-seven days, or less time, from the date of planting the seed.

Coldframes—A coldframe has no bottom heat, otherwise it is like a hotbed. The exhausted hotbeds are often used as coldframes in early spring. Coldframes are very useful in early spring for starting vegetables early to be later transplanted to the field. Hotbeds would not do, as they would force the plants too fast. Coldframes are also useful for receiving plants like tomatoes, which have been started in hotbeds, or forcing houses, but require a gradual process of "hardening off" before being transplanted to the garden. Another use for coldframes is for wintering young cabbages, lettuce and other plants of like hardiness which are sown in the fall.

Where the coldframe is always to be used as such it is not necessary to make the deep pit in the

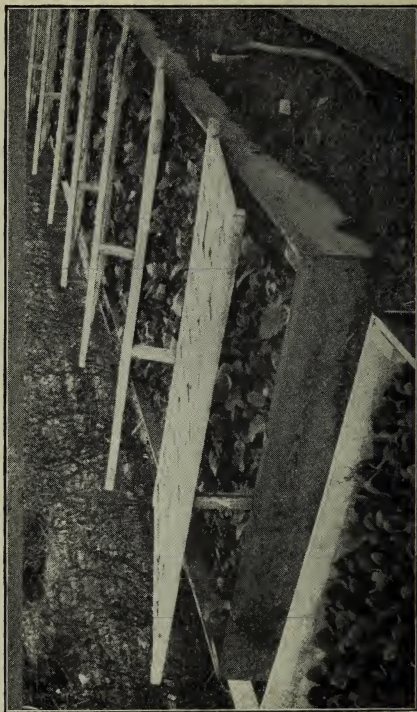


FIG. 2.

FIG. 2. A series of hotbeds with one framework around them—one side being made lower than the other so that water will drain off the covers. Sashes are propped up for airing the crop of cauliflower, lettuce and radishes growing in frames in early March. Heat is furnished by fermenting manure and sunlight. A portion of a cold-frame is shown in the foreground where cabbage plants are being hardened off for early setting in the garden.

earth. All the heat needed is derived from the sun shining on the glass covers, which are precisely the same as the sashes for covering hotbeds. In gen-

eral gardening, even in a small way, the coldframe is almost an indispensable companion to the hotbed. The hardening off process of plants is the important step between the hotbed and garden conditions.

GARDEN SEEDS.

Longevity of Seeds—Seeds of every kind are little undeveloped plants wrapped up in some kind of a protective covering. The length of time that a seed will live varies with the kind, the conditions under which it was grown, the degree of ripeness and the manner in which it is stored and handled. There is a limit to the life of every seed, yet when this limit is reached there may be no evidence in the seed itself, either outside or inside, to indicate the loss of vitality.

Testing Seeds—In order to determine whether seeds are dead or worth planting it is necessary to test them. The seed test should be made well in advance of the planting season, so that in case they are found to be unsatisfactory there will still be an opportunity to replace them before planting time. In testing, a certain number of seeds, say fifty or one hundred, should be selected from the center of the package and planted in a box of sand or loose soil and kept in the house. By noting the number of seeds that come up it is a simple matter to determine the percentage of good seeds in the package. It should be remembered, however, that the mere fact of the sprouting of a seed is not sufficient evidence that it will make a good plant. The seeds should sprout uniformly and come up evenly and show evidence of making vigorous plants. Seeds are often adulterated by having mixed with them others of inferior varieties which have been killed by baking in order to prevent the fraud being detected, or

the seeds of weeds or other plants may be put in to help make up the bulk. All of these things will be detected in a seed test.

GARDEN CROPS.



FIG 3.

FIG. 3. One-year-old asparagus plants grown by Missouri Experiment Station. Seeds were planted in hotbeds in February and plants moved to the garden late in April. Such a plant is strong enough to permit of cutting the young stems the second season when ordinarily this could not be done until the third year.

Asparagus—This is one of the crops that live year after year without replanting and, being so easily

kept, it deserves to be more widely grown by farmers. Asparagus is especially adapted to a place in the small garden of the town or city resident. Asparagus is a gross feeder; land can scarcely be too rich. Since the asparagus plantation should be made for a lifetime, it is well to give careful attention to the selection of the soil and to the choicest place that can be permanently set aside for the purpose. In the home garden asparagus should be in rows at one side of the garden plot, so that it will not interfere with the plowing. It usually looks best at the farther side, where its beautiful plants make an attractive background in late summer and fall. The old plan of planting asparagus in beds is not the best. One row, from 75 to 100 feet long, if properly kept, will yield a surprisingly large amount of the juicy, succulent stalks, and will be enough for table use in season for the average family.

In buying plants secure the best one-year-old crowns obtainable. See Fig. 3. Asparagus roots do not grow straight down in the soil very well unaided, so they should be planted deeply. Planting is usually done in the spring. A furrow six to ten inches deep should be opened and the plants set in the bottom. The roots should be covered with loose soil or thoroughly rotted manure or other vegetable matter to a depth of two or three inches. As the plants grow the trench is gradually filled with soil. If the trench were filled at first, the young plants might not have strength enough to push through to the surface. The plants should be set from two to three feet apart in the rows and by fall the furrows should be filled until they are level with the rest of the ground. If the soil is not naturally rich, the furrow should be dug deeper than the figures given and partially filled with very rich soil, or with composted manure.

The plants should have two full seasons' growth before any of the shoots are cut; that is, the first cutting is done at the beginning of the third season. Sometimes a few stalks are taken the second year, but it is usually better to wait until the third season, when the plants will have become thoroughly established. It is easy to injure the bed by cutting it for too long a period each season. Begin to cut in the spring as soon as the first stalks appear above the ground and cease not later than the first of July. It would be even better to discontinue the cutting by the middle of June. During the time the crop is being harvested every stalk should be removed, even though many are too small and poor for use. After the harvest time is over the plants are allowed to grow with freedom and it is the growth that they make during the remainder of the season that enables them to store up enough energy in the crowns to make the vigorous growth they do so early in the spring. Without there is a heavy top growth after the cutting season, one cannot expect a good growth of roots and a heavy crop of young stems during the following year.

Late in the fall, after the tops have died, they should be mowed down, raked off of the patch and burned. If allowed to remain on the ground, although they would furnish some winter protection, the berries they contain would find their way into the soil and there would be so many seedling plants as to make trouble. Furthermore, asparagus is attacked by a rust disease which thrives on the plants during late summer. Burning destroys the germs of the disease, which would otherwise be left on the ground.

After the tops are removed the rows should be mulched heavily with old manure, which is to fur-

nish winter protection and to add fertility to the soil. In the spring the soil should be thrown toward the middle of the row from both sides with a turning plow, or by being drawn up with a hoe. After removing the coarser parts of the material with rake or fork the soil immediately over the row should be thoroughly forked up. A little practice will enable the operator to turn the soil over, down to the crowns of the plants without injuring them. Finish the row, which is now a slight ridge, which falls gently towards both sides, with garden rake which will leave the soil in fine tilth. The rows should be tilled occasionally even after the shoots have begun to appear above ground, although these later cultivations will consist of stirring only the immediate surface of the soil, preferably with a rake, so as not to break off the young shoots.

It is customary to harvest asparagus by cutting the shoots three or four inches beneath the surface by means of a long knife. Any long butcher-knife will serve the purpose. The blade should follow down by the side of the sprout to the proper depth and by a twist of the wrist force it through the bottom part of the shoot, all the while holding the sprout with the left hand. If a careless person should make a wide sweep with the blade through the soil a number of the sprouts not yet visible above the surface would certainly be cut off and ruined. An asparagus planting should bear being cut over each day if there be suitable growing weather, as it is customary to remove the sprouts at their first appearance above ground. The value of asparagus lies in its succulence and tenderness. These qualities are secured by very rich soil and by thorough attention to good tillage. The Conover Colossal and Palmetto are the leading varieties.

Beans—The common beans are of two general types—the bush bean and the pole bean. In this country the bush, or “bunch,” bean is by far the more important, since it can be grown without the labor and expense of providing a support upon which the plants may climb. Bush beans are grown both as field and garden crops. In the garden they are used mostly as “string” beans, the pods being picked when they are two-thirds grown and the pods and beans together being eaten. The pods of a good string bean are those which have no “strings.” The pods snap cleanly in two, this giving rise to the common name, “snap” beans. In order for string beans to be of the best quality, they should make a rapid and continuous growth. The soil should be rich and well cultivated.

The bean is a warm weather plant and therefore should not be planted in spring until after the weather has become thoroughly settled. In late summer plant again for fall use. A succession may be had all summer.

There are other types of garden bean which are used as “shell” beans. The large, soft seeds are used just before they begin to harden and the pods are not eaten. The well known lima beans belong to this class. Lima beans demand a long season and continuous growth, especially the tall, or true, lima varieties. Since the flowers are sometimes injured by the hot dry weather of mid-summer it is well to get the plants started as early as possible in order that some of the fruit may be set before the hottest weather. These should be grown upon soil that is the richest and which is in the best physical condition. Soils that are light and sandy are usually to be preferred. The tall varieties must have poles. When poles get scarce it is a good plan to set long stakes

ten or twelve feet apart and to run wires or heavy strings from pole to pole, one strand near the top and one within a foot or so of the ground, and then to connect these with strands running from one to the other.

Beet—The garden beet is easily grown and is a very reliable crop. It prefers a very rich, loose soil and should be given good tillage, especially during the early part of the growing season. For home use the seed should be planted as soon as the ground is in workable condition in the spring, planting the seeds rather thickly in the rows and then thinning later, when the plants can be pulled out and used for greens. In this thinning operation the plants which are left should stand about two inches apart, at the least. This leaves room for the great enlargement of the roots of those reserved for later in the season.

In the home garden the rows should be about sixteen inches apart, but where greater areas are planted than the garden will accommodate and where horse-power cultivation can be practiced the rows should be two feet, or slightly more, apart. As for all other root crops, the cultivation must be thorough, and especially so early in the season, in order that the moisture in the soil will not be lost through evaporation, but reserved for the use of the rapidly-enlarging roots of the beets. This cultivation in a small plot may be most conveniently done either with a wheel or hand hoe, cutting off all weeds and loosening the soil for an inch or so in depth. In field culture, where horse-power can be used, any good, fine-toothed cultivator, which will stir the soil thoroughly, will answer the purpose.

Among the varieties for the garden those giving the best results are those having a small top with medium-sized root, of regular and uniform shape

and fine grained. They are in the best condition to use when about two-thirds full grown, as then they are the sweetest, tenderest and most succulent.

Beets are easily forced by sowing the early maturing kinds in hot-beds, where they should receive practically the same treatment as shall be described later for the radish.

Cabbage—Cabbage can be grown under a greater variety of conditions and this vegetable will endure more lack of care than any of the other garden crops, but like all other crops it quickly responds to suitable conditions and must be given the highest cultivation for its best development. A good clay loam, when well supplied with barnyard manure, makes one of the best soils for cabbage, and for the earliest maturing varieties the soil must be especially well fertilized. In some of the eastern sections of the country it is occasionally necessary to change the land on which cabbage is grown on account of a disease which attacks the roots.

The varieties of cabbage are divided into the early and late sorts, and the methods of cultivation adapted to the early varieties are somewhat different from those followed in growing the late varieties. In growing the early sorts the seed should be sown rather thickly in flats in the hotbed early in the season. As soon as the seedlings have made their first pair of leaves they should be transplanted into other flats and given more room, so as to make strong, stocky plants which will be able to stand alone when set in the field, even if they are somewhat wilted. While in the hotbed the plants should not be forced in the least or they will become too spindling. About five or six weeks after sowing the plants should be hardened off and when they are about six or seven weeks old they are ready

to be set in the field. In setting them a hole should be made in the soil with a small dibber and the plants set well down with the soil firmed tightly about the roots. Where cultivation with a hoe is practiced the plants may be set about eighteen inches apart each way, but if a horse-power cultivator is used the rows had better be two or three feet apart for easier cultivation.

Cultivation should begin immediately after setting the plants, and after each rain the surface should be stirred as soon as the ground can be worked, or at least once a week until the crop is ready to harvest.

For late varieties of cabbage it is not necessary that the soil be as rich as for the early varieties, the heavier field soils answering the purpose quite well.

The seed of the late varieties are either planted in a seed-bed in the field or garden, or in small hills about the field where the plants are to mature. The former method leaves the space in the field to be occupied by some early-maturing crop, while the cabbage plants are growing to a sufficient size for planting out, but it has the objection of requiring the plants to be set out at a time when the soil is usually quite dry and the plants consequently suffer from lack of moisture. Where grown in hills, only a few seeds are planted in a hill and as soon as the plants begin to crowd each other all but the strongest are removed. This has the advantage of not requiring the transplanting to be done during dry weather and allows the plants to mature at an earlier date than when transplanted.

Carrot—This is one of the most easily grown root crops for the home garden, a fact which is not well appreciated, as it should be. The carrot is a rank feeder and does best in a rich upland soil or in a

heavy clay soil heavily fertilized with barnyard manure. For home use the carrot can be grown in almost any soil which is not too wet. The soil should be put in good condition before planting the seed, and as the seed germinate slowly care must be exercised to have the land as free from weed seeds as possible, or else some quick germinating seed, such as radish, should be sown with the carrots so as to mark the rows and allow cultivation to proceed. The seed should be sown in drills about a foot or eighteen inches apart early in May, and should not be planted too thickly owing to the cost and trouble of thinning. Where the soil is very rich the thinning should be done so as to leave the plants about two or three inches apart for the larger varieties, but in the heavier soils, which will not give such great root development, the plants can stand closer together.

The young plants are quite delicate and during the early part of the season especially the cultivation must be very thorough in order to keep the weeds in check and not allow the young plants to be smothered.

For a late crop it is not necessary to plant the seed till June or July, but otherwise they are treated the same as the early crop and are gathered and stored for winter use just before freezing weather.

Cauliflower—Home gardens are seldom provided with this delicious vegetable owing to the supposed difficulties in the way of growing it, but the market gardener finds it one of the most valuable of his garden crops. The first essential in growing cauliflower is to get good seeds. Buy the best obtainable seeds, as the cheaper grades are bound to produce failures and consequently discourage the grower against trying again. The best seeds usually cost about \$3.50 per ounce.

Cauliflower may be grown as a hotbed crop in winter, or as a spring vegetable in the garden. Where it is desired to grow it as a hotbed crop the seed should be sown in early winter in flats (shallow boxes, from one to two feet square), sowing the seed thickly and transplanting the seedlings after they

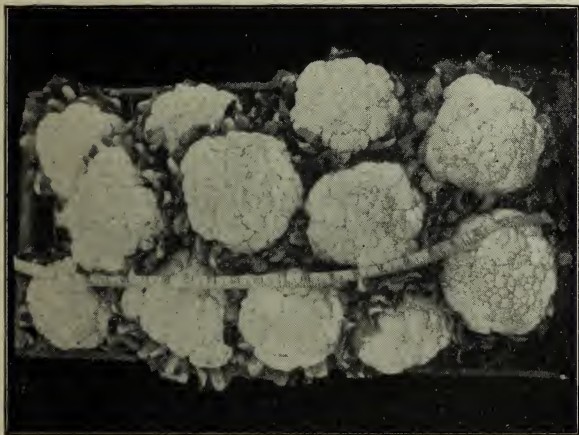


FIG 4.

FIG. 4. Cauliflower heads five and six inches in diameter grown in hotebeds in late winter by the Missouri Experiment Station.

have made the second leaf. When about six weeks old the seedlings may be set in the hotbed about a foot or eighteen inches apart. Only enough water should be applied at first to keep the plants from becoming badly wilted, but as soon as they have

taken hold of the soil water may be applied more liberally. In hotbed culture great care must be given to the ventilation and on every day, when it is possible to raise the sash over the frames without chilling the plants too much, they should be raised, if only a few inches. See Fig. 4 for specimens of cauliflower heads grown in hotbeds.

Since the roots of the cauliflower run very close to the surface and it is not always practicable in the hotbed to cultivate, it is a common practice to scatter a thin layer of rich, friable soil over the surface between the plants. As the plants reach maturity they must be given more air, and it is often advisable to give an occasional application of manure, from either the cow stable or the poultry yard.

When the heads begin to form, three or four of the inner leaves should be broken, so as to fold over the head. This protects the head from light and keeps it from becoming loose and open.

In growing cauliflower in the field the seed should be treated in practically the same way as cabbage, and when the seedlings are properly hardened and all danger of frost is over they are ready to be set in the field. The field soil must be of the richest obtainable; a strong loam, having a liberal amount of well rotted manure incorporated with it, is the best soil. The subsequent treatment is practically the same as that given for cabbage.

In field culture, when the crop is in danger of being injured by an early frost, it is sometimes advisable to pull up all of the immature heads, with the roots and leaves, and set them out in a cool cellar or a coldframe, where many of them will develop fair-sized heads.

No matter whether being grown in the hotbed or garden, two things must be borne in mind regard-

ing cauliflower; first, the seed must be the best possible to obtain. The cauliflower is, of all garden plants, the most liable to deteriorate unless scrupulous care is given to the selection of seed, and even the best stock will "run out" unless the requisite skill and care in growing the seed be continually observed. The difference between the very best seed and moderately good seed will usually result in an excellent crop in the one and a complete failure in the other. Second, cauliflower is a gross feeder and the amount of fertility in the soil must be at the maximum for the best results.

Celery—Celery is a garden crop that is grown principally for the fleshy leaf stalks which, after being blanched, are eaten raw with salt, made into salad, or cooked and served like asparagus.

The seed are sown thickly in a flat, or hotbed, and covered with a thin layer of sand, after which the soil is well firmed. These are then kept in a moderately warm place until the seed germinate, which will take several days. As soon as the seed have sprouted they should be carefully watered until they have made the second leaf, when they are to be "pricked out" and transplanted to other flats, where they may have more room. The seedlings at this stage are still very small and the pricking out and transplanting must be very carefully done, placing them into new flats in rows about three inches apart and three-fourths of an inch apart in the row. It is necessary now to shade them for a day or so, until they get established, after which they may be exposed to the full sunlight and left until they are large enough to set out in the field. It may be necessary, if the plants have made a very strong growth, to shear off about one-third of the top of each plant. This causes a greater root growth and makes the

plants more stocky and better able to stand the shock of transplanting to the field.

The soil best for celery is one which has been made very rich with old compost, plenty of nitrogenous material and abundantly supplied with moisture. It should be made ready to receive the plants before the latter are removed from the flats, or hotbeds. In taking up the celery plants to set out in the field the tops and roots should be slightly trimmed to make the plants stand the shock of transplanting the better. If the weather should be very dry at this period it is almost absolutely necessary that the plants be watered in some way, either by letting the water flow along the row or by pouring a small quantity of water about each plant just after it is set. Just on this account many persons prefer to have their celery bed located near a well or spring, where it is easiest to get the water.

Cultivation during the early part of the season should be done often enough to keep down all weeds and to conserve the moisture in the soil; later in the season, as the plants near maturity, cultivation is stopped on account of the blanching process which must be undertaken.

As soon the the leaf stalks reach the age at which they become large enough to eat it is necessary to bleach them in some way to make them tender. This is done primarily by shading the leaf stalks. An easy way in a small garden is to gather together the leaf stalks of each plant and tie around them several thicknesses of newspaper, so as it will reach from the soil to the top of the plant, leaving only a few of the topmost leaves sticking out of the paper cylinder. Another way, and perhaps an easier one, is to place wide boards on each side of the row close against the plants and leave it there till the leaf

stalks are sufficiently blanched, which will take from two weeks to a month.

Still another method is to grow the plants so close together in a bed that they will shade each other, making it necessary to protect only the outer rows with boards. Some people prefer to ridge earth up around the plants, as shown in Fig. 5. This,



FIG 5.

FIG. 5 Blanching celery by banking the soil around the plants. The tops are covered with straw during cold nights.

though, is a rather laborious process, since the leaves on each plant have to be drawn up around the crown and the earth packed tightly around around them. Although the most laborious, this method produces the whitest, tenderest and most succulent stems of all.

If celery is to be kept for winter use it must be removed from the field before severe freezing weather sets in, taking up a large part of the root system with the tops and then setting out again in a box or cellar. By leaving plenty of roots on the plants the tops will continue to grow for some time and the leaves produced at this time are by far the best.

Corn—Corn for table use is more commonly called sweet corn and its cultural characteristics are essentially the same as for field corn.

Sweet corn does best on a medium heavy loam which has been made rich and warm through liberal application of manure. In manuring a garden spot, where fresh manure has been applied, sweet corn may be very satisfactorily grown, as the corn thrives better in the presence of fresh manure than any of the other garden crops.

The seed should be planted in hills three and a half feet each way, or in drills, having the rows about the same distance apart. Early in the season the cultivation should be rather deep, but as the plant reaches maturity, only the surface should be stirred, owing to the shallow rooting of the mature corn plant.

The dwarf, early maturing varieties are the best for home use, and for a continuous supply throughout the season several plantings about two weeks apart should be made.

Cucumber—This plant does moderately well under rather unfavorable conditions, but does best on a deep, rich, retentive loam which is not extremely heavy or sandy. Soil which is well adapted to corn or wheat makes good cucumber land. The seed need not be planted till the middle of May or first of June, when the ground has become quite warm. Plant in hills, sowing several seed about in the hill so as to provide against the ravages of insects.

These seeds should be covered about an inch deep and the earth firmed well over them. As soon as the seedlings are up, the soil about them in the hill should be loosened up after each rain and the plantlets dusted with paris green or some substance distasteful or poisonous to the striped beetles, which attack the plants very early in the season.

Cultivation should be kept up throughout the season, or until the vines have grown to such an extent that they would be injured by the work.

Some persons prefer to start the seed in a hot-bed or cold frame instead of planting in the field, especially for a very early crop. A common practice for this purpose is to sow the seed in an old strawberry box, tomato can or flower pot and then transplant to the field as soon as of sufficient size. Another plan is to sow the seed on inverted pieces of sod five or six inches square. Whichever method is used, the seedlings must be hardened off before setting in the field, and each piece of sod or the soil from each box set as carefully in the field as possible, for the cucumber plants do not well stand the shock of having the roots injured.

Eggplant—This plant is quite seisitive to cold, and for that reason is not very extensively grown in the north, but in the warmer climates it can be readily grown in the home garden. It prefers a deep, rich, loamy soil which is quite dry, enduring a greater drought than any of our other garden crops.

Since it takes about four or five months for the egg plants to reach fruiting age it is necessary to start the plants early in a hot bed or in flats, sowing the seed rather thickly and transplanting to other flats when showing the second leaf. When about six inches high the plants are ready to be set in the garden and should be set in rows three or four feet apart. The cultural directions are prac-

tically the same as for cabbage, except that it requires a much longer season, and great care must be taken that the young plants are not checked in their growth. After setting in the field, however, every effort must be made to hurry the plant into fruiting before the approach of cold weather.

Ginseng—This plant has created a great deal of interest among all classes of people within the past few years, owing to the large prices which the roots have brought on the market. Ginseng growing can be overdone, owing to the very limited market for the roots, they being sold almost entirely in China. Government statistics gathered in 1904 seemed to indicate that enough ginseng was then planted to more than meet the demand for roots when the beds are old enough to produce the marketable product.

The plantings are usually started either from seed or from one-year-old plants. For a quick start it is best to begin with one- or two-year-old plants, purchasing them from some ginseng dealer, as it takes from a year and a half to two years for the seed to germinate. The plants must be set no closer than a foot apart and then well shaded with a screen made of lath or branches of trees supported on some sort of framework, since the leaves cannot stand the direct heat of the sun. The soil for ginseng should be very loose, made almost entirely from leaf mould or very thoroughly rotted manure. Great care is necessary in setting the plants to see that the roots are spread out in their natural positions, otherwise they will not increase in size. When the roots are four years old they are ready for marketing. The roots should be dug just after the leaves die in the autumn, being careful to not injure any of the roots, as the uninjured or un mutilated roots bring a higher market price. Before putting the roots on the market they must be dried, and this is

usually done, where there are only small amounts, by spreading out on a board in the sun till dry, but usually this is too slow a process. A much better method is to place in a box which has had the bottom replaced by a screen, and then suspend over a stove where a current of warm, dry air may constantly pass the roots. In this way they will dry much more quickly and make better products for the market than when sundried. In this drying process the roots as a rule lose about two-thirds of their weight. Good roots on the market bring from 40 to 50 cents per ounce, dry weight.

Besides the roots, ginseng is of marketable value in another way, and that is in the production of seed. A four- or five-year-old plant will produce from forty to fifty seeds annually, and these retail at from 2 to 5 cents each, at the present time, 1905, the buyers, of course, being persons who are starting ginseng beds.

Ginseng should be grown only on a small scale, as the expense of starting a bed amounts to considerable for even a small one, and the ease with which the market can be flooded makes it an unsafe crop to grow in a very extensive way. With the Chinese ginseng has a superstitious value as a preventive or cure for nearly all ailments. In America the roots are regarded as having but little medicinal value.

Horseradish—This is one of the "old-fashioned" vegetables which is not as extensively grown nowadays as it should be. It is so very easily grown and so very hardy that every dooryard should have a clump to furnish this delicious condiment for home use.

Horseradish is propagated principally from root cuttings, using sections about four or five inches long and from the size of a lead pencil to that of one's little finger. The top cut from the root is gen-

erally thrown away, as the roots formed from that portion are generally so small that it does not pay to bother with handling them. The horseradish does well on all soils excepting those which are excessively sandy or the very stiff clays. For the longest and largest roots any good deep loam will give very satisfactory results.

In planting, the cuttings should be placed right end up in holes made with a sharp-pointed stick, setting so that the top is two or three inches below the surface. It is important that the roots be set right end up, as they do not do well nor make well-shaped roots when set bottom end up.

Horseradish should occupy a place in the garden towards one side or end where it will not be in the way of cultivation, since it will live for years in the same place. It may be necessary to carefully remove a part of the bed occasionally, especially if the plants are spreading. Where it is desired to grow the roots principally for market, the beds should be made anew each year, planting the roots in rows and growing some companion crop between them.

Kale—This crop is handled in much the same manner as cabbage, requiring the same kind of soil,—a well fertilized clay loam. The plants are very hardy, and except in the extreme northern states may be left out over winter with little or no protection.

The seeds are sown in a seedbed in the same manner as late cabbage, and transplanted, when four or five leaves have been made, into the field. The rows in the field may be as close together as is convenient for cultivation and the plants pulled for use as soon as they have made sufficient growth.

Kohlrabi—This plant is a near relative of the cabbage, and is grown for the enlarged or swollen portion of the stem just above the ground, which is



FIG. 6.

FIG. 6. Heads of lettuce of different varieties grown in hotbeds in late winter at the Missouri Experiment Station.

used for the same purposes and in the same way as turnips. In some parts of the country it has supplanted the turnip as a spring vegetable. The seed should be sown in beds where the plants are to mature, and the plants pulled and used when about two or three inches in diameter. Kohlrabi should be grown in a soil containing sufficient fertility to hasten the growth of the plants, as in this way the tubers will be more succulent and sweeter and not become woody or bitter, as do those which grow more slowly.

Leek—The leek is closely allied to the onion, which it resembles in flavor, and its cultural requirements are practically the same. The seeds are sown in a bed in light, deep loam which has been well prepared. When the seedlings are about six or eight inches high they are transplanted into rows about eighteen inches apart and eight or nine inches in the row. In transplanting, both the tops and the roots should be slightly trimmed. As the plants grow, the soil should be gathered up about the stems so as to insure blanching, as it is the blanched stem which is most desired. It requires the entire season for its growth, and in the fall, as cold weather approaches, the plants are taken from the soil and stored for winter use in the same manner as celery.

Lettuce—Lettuce is one of the most extensively grown of all garden vegetables, and its ease of cultivation makes it one of the most popular. In the home garden it is grown principally as an early spring crop in the open ground, but it is very extensively grown as a hothouse or hotbed crop. For perfection in growth, lettuce needs a cool atmosphere and a loose, rich soil. The seeds need to be started in flats and transplanted to hotbeds, where they are set about a foot apart each way and kept growing rapidly. The cabbage, or heading, sorts

require a rather long season and considerable care for perfect development, while the looser kinds may be grown more easily. In the home garden the seeds may be sown in early spring in good, rich, garden soil, placing the seed rather thickly in rows about a foot apart. As the seedlings begin to crowd each other, thinnings should be made. These plants which are removed are usually large enough for table use. With the cabbage, or heading, sorts the bed should be thinned sufficiently to allow the plants which remain to stand about ten inches or a foot apart. These plants will then form large heads and afford the grower whiter, tenderer and more crisp leaves than those pulled earlier in the season. (See Fig. 6 for heads of different varieties grown in hotbeds.)

Lettuce can be grown in the garden as a companion crop between cabbages or cauliflower or other slow-growing plants. In such cases the lettuce seed is sown or the seedlings transplanted into the bed containing the main crop. The lettuce will reach a usable size before the other crop is beginning to be crowded.

When a long season of harvesting is wanted it is necessary to make a succession of plantings two weeks or more apart, but in case the main part of the lettuce comes to maturity before the hot weather of summer sets in, the late grown lettuce is too tough and bitter to be relished.

Muskmelon—This crop does best on a clay-loam soil which is well drained. The seeds should be planted in hills in the garden in practically the same manner as cucumber. Where the land has not been well fertilized with manure it is a good plan to remove the earth in the hill to a depth of four inches and put on the bottom two inches of well-rotted manure, fill in an inch of soil and scatter several seeds about over the top. These are cov-

ered with about an inch of soil and then well firmed. The hills should be about five or six feet apart, and the method of tillage practiced as for cucumbers.

Onion—For home use and for some market purposes, where the succulent, blanched stems are wanted, the onion is propagated by planting small bulbs which are formed on different parts of the onion plants the year before. These small bulbs are obtainable on the market under various names, depending on what part of the plant they were formed, as: sets, top-onions, multiplier or potato onions, scallions, etc. These bulbs are planted close together in rows in good garden soil and in a few weeks will have formed stems of sufficient size to be eaten.

In growing onions for winter use the seeds are started either in hotbeds or in a seedbed in the open field, and when the seedlings are about a foot high they are transplanted to rows in the field, in which they are set about three inches apart. They are generally planted in long rows and the cultivation done with a wheel-hoe.

Onion seed deteriorates rapidly, and in buying seed it pays to get the best it is possible to obtain.

Okra, or Gumbo—This plant will do well on any good vegetable land. The seeds should be sown in the spring, as soon as the soil is workable, dropping the seeds two or three inches apart in long rows, and after the plants have begun to crowd, thin out, leaving the plants standing about a foot apart for the dwarf varieties. The pods should be cut before they get of such an age that they are stringy and tough. For continuous fruiting all of the old pods should be kept removed.

Parsley—The leaves of this plant are used for garnishing and seasoning meats and soups, and it is so easily grown that it should be grown in more kitchen

gardens than it is. Two or three plants removed from the garden in the fall and put in pots or boxes make attractive window plants and will supply a small family with plenty of leaves all winter.

It is a near relative of the carrot and parsnip, and is grown in the field in essentially the same way.

Parsnips—These plants need a deep, rich soil, much the same as for carrots. Only the best and freshest seed should be used and should be planted thickly in long rows early in the spring. Since the seed germinate slowly, it may be advisable in land which is weedy to mix the parsnip seed with some quick germinating seed, such as radish, which will serve as a marker in cultivating. The radishes can then be pulled for use as they begin to crowd the parsnips.

Cultivation should be kept up till the foliage becomes dense enough to shade the ground.

Peas—This vegetable, like all other leguminous plants, requires a soil which is not too rich in nitrogen, but which contains an abundance of potash and phosphorous. The soil should be in good tilth and the seed planted as early in the spring as danger from frost is over. In loose soil the seed should be planted in trenches about four or five inches deep and covered with an inch of soil; then as the seedlings get large enough the soil should be filled in the trench and firmed about them. In heavier soils the seed should be planted in ordinary drills on the surface and covered about an inch deep.

Only shallow cultivation should be given, loosening the surface every week or ten days and after every rain.

The dwarf varieties may be planted sixteen or eighteen inches apart, but the taller varieties, which need to be staked, should have from two to two and a half feet between the rows.

Pepper—Peppers require rather a long season for their growth and should be started in the hotbed in February or March, sowing the seed thickly in flats and then transplanting to other flats when of a sufficient size. The garden soil should be light and warm and contain plenty of humus. Its setting in the field plants should be set in rows eighteen inches by two and a half feet. Cultivate well throughout the season to keep down the weeds and conserve the moisture.

In gathering the pods disagreeable burns are sometimes caused by the juice of the fruit, unless gloves are worn. This irritation may be relieved by washing the hands in sweet milk.

Radish—Radishes and lettuce are the most highly prized and most extensively used of the spring vegetables. The radish requires a light, loose, rich soil, in which it should make a quick growth. It can be grown as a companion crop with any of the other spring vegetables, as it is out of the way before the other crops begin to be crowded. Like lettuce, it is quite hardy and can be planted very early in the spring without danger of its being injured by late frosts.

The seed should be sown thickly and then thinned to about two inches apart. Repeated sowings are necessary in order to have crisp radishes in a continuous supply.

Radishes are very extensively grown during the winter in greenhouses for market purposes and anyone with a small hotbed need not be without a supply during the winter months. The seed are sown in drills six or eight inches apart, either by themselves or between rows of some later maturing crop, as lettuce or cauliflower. The soil should be especially rich and friable so as to supply plenty of plant food and enable the plant to make a rapid growth. In

forcing, during the winter, the plants should be rather close to the glass of the hotbed sash and the seedlings thinned to about two inches apart. This will keep the plants from forming too much top in proportion to the root.

Rhubarb—This plant is a perennial and its place in the garden should be in a long row at one side, where it will not interfere with the cultivation of other plants. For best growth it should have a very heavily manured soil, and have a good dressing of manure spread over the bed every winter. Rhubarb may be grown from seed, but it is more easily and quickly propagated by dividing the roots of an established plant. In the fall, after the leaves have all been killed by frost, but before the ground freezes, the roots should be dug up and divided, leaving one or more good buds on each piece. These pieces then are planted about four feet apart, in rows. As soon as the ground freezes after planting a heavy dressing of manure should be spread over the row and worked in well in the spring. The beds should be renewed every four or five years, and all flower stalks pulled out as fast as they appear.

Rhubarb can be forced in winter very easily by removing the old roots from the soil after they have been frozen slightly and then packing them close together in a cool cellar, covering up with a few inches of good soil and watering sparingly. In a short time the plants will push out an abundance of leaves having very thick stalks, but small blades. These stalks are whiter and not so acid as those grown in summer in the field. As soon as the roots have formed all of the leaves they will, they should be thrown away, as they are worthless. Rhubarb is also forced in winter by placing over a hill a barrel having both head and bottom removed and surrounding the barrel with a cone-shaped pile of fresh manure. The heat fur-

nished by the fermenting manure will afford sufficient warmth to force the plant into growth. On cold nights or days the barrel should be covered with some boards or old sacks.

Salsify, or Oyster Plant—The seeds of this plant should be sown in a deep, rich garden soil early in spring, planting in drills two or three feet apart, depending on the manner of tillage. The plants should be thinned to stand two or three inches apart. They require the entire season for their growth, and unlike most root crops need not be dug up and stored for winter use, except in the north, where the ground freezes deeply and remains so for some time.

Squash—The squash is easily grown in any quick, warm soil, a sandy loam being the best. The seed should be planted in hills as early as possible after danger of frost is past, so as to give the plants all summer in which to mature their crop before the early frosts in autumn injure the vines. The hills should be from twelve to eighteen inches across and contain from six to ten seeds. Their subsequent treatment is practically the same as for cucumbers and muskmelons.

Spinach, or Spinage—This crop is used primarily for "greens" in the spring. It is of easy culture and does well in any good soil. The seed should be sown where the plants are to stand, for if transplanted the shock which they receive will usually cause them to run to seed too quickly. For early spring use plant the seed thickly in drills during August and September, the year before, and protect slightly during the winter with mulch of straw. The plants should be thinned to two or three inches apart where too thick.

Spring sown seed may be put in as early as the ground can be worked and the plants are ready to be

pulled in about six weeks, but, of course, are very much smaller than those sown in the fall.

Sweet Potato—Sweet potato plants are propagated from sprouts from the tubers. Sprouts are abundantly formed if the tubers are placed in a single layer in a hotbed or coldframe and covered with a few inches of soil. When they have become three or four inches high the sprouts are carefully removed from the tubers and planted out in the field when the ground is warm and the weather settled. The rows should be four or five feet apart and the plants set two feet apart in the row. They will need to be given good care in setting and carefully cultivated till they get established, after which only an occasional cultivation is necessary. The vines should not be allowed to root down at the joints and can be prevented from doing so by moving the vines about during cultivation. The tubers should be pulled as soon as the tops have been killed by frost. In storing sweet potatoes for winter they should be placed in a warm, dry place, and should be handled without bruising in any way.

Tomato—The tomato prefers a sandy loam, a warm position and a long season in which to mature its crop of fruit. The plants should be started in flats early in the spring by sowing the seed thickly and be transplanted as soon as having made the second leaves to other flats, giving each plant about an inch of room on each side. They should not be forced, but allowed to make a slow, steady growth, as much stronger, stockier plants will result. They should be able to stand up when transplanted to the field, even though they be somewhat wilted. A common practice is, when transplanting the first time, to put them into old tin cans or strawberry boxes, from which they may be set in the field without disturbing the roots at all.

With the tall-growing sorts the best fruit will be had when the plants are trained to a single stem and tied to a pole. In such cases the side branches should be kept pruned in to about a foot in length and allowed to make only one or two fruits each.

Turnip—For an early crop the seed should be sown in drills in a rich, mellow soil. The seed should be only slightly covered, but firmed somewhat and the young plants thinned to four to six inches in the row. The turnip rapidly becomes woody on the approach of warm, summer weather, and for a continuous supply several plantings should be made and the young plants pulled before they become too fibrous.

Turnips are more commonly grown as a fall crop, the seed being sown in drills or broadcast over the surface in mid or late summer, after the other crops are out of the way. They are left in the field till the tops have been killed by the frost, when they are dug up and stored in a cool cellar or pit for winter use.

Water Melon—This plant reaches its highest development in the warm south, where it has a long season in which to grow. In the north only the warmest and quickest soils should be used. The seeds may be sown in the open field or on pieces of inverted sod in the hotbed and transplanted to the field. The hills should be prepared and planted in the same way as for cucumbers. Where too many plants are in a hill some should be removed, leaving three or four to remain. In cultivating, care should be observed to not injure the vines, as they are very sensitive and where very much injured form only imperfect fruits.

MONTHLY PLANTING CALENDAR.

Some of the principal operations of the year are here referred to and are intended more as suggestions for the inexperienced gardener rather than to

the growers who have had more practice. These remarks should be regarded more as suggestions than definite statements, since the conditions of different soils and locations as well as the winter weather determine in the greater degree what should be done at certain times of the year.

● **January**—During this month we should begin the work of preparing the garden. Manure should be spread over those parts of the garden needing it most, and more should be piled in stacks to rot and be ready for use next year. Get the hotbed ready for early spring crops. Send for the catalogues of reliable dealers, and look over any seeds which may be on hand, testing them to see if they are worth planting. Lifeless seeds of cauliflower, parsnip, onion and others means disappointed hopes later in the season.

February—The hotbeds should be started during this month and the seed of cauliflower, cabbage, tomatoes and egg plant should be sown in flats in the hotbed in order to be ready to set out as soon as the soil is warm enough. The seedmen's catalogues should be looked over and an order placed early for seeds.

March—Transplant tomatoes, onions, cabbage, radishes and lettuce which were in flats. Harden these off during latter part of the month and make ready to set in the garden. As soon as the soil is workable spade or plow up the garden and sow onion sets, out-door radishes and lettuce. Get the rest of the garden worked up and ready for planting.

April—This and the month following are the times when the larger part of the garden should be planted. Asparagus roots, peas, beets, celery, cabbage and potatoes should be planted. By the middle of the month parsnips, carrots, salsify and egg plant may be planted in the garden seed bed. Tomato and cabbage plants from the hotbeds should be given

more exposure to the outside air, leaving them out every night that is not too cool. The early planted seeds will need cultivating to keep free from weeds which will be starting.

May—Thinning of the early planted crops must be done as well as planting the remainder of the seeds. Tomato and cabbage plants can now be set. Keep the cultivator going.

June—Celery from the hotbed should be set in its permanent place in the garden. Begin sowing seed of the late fall crops, and repeat plantings of the early crops which are now being gathered. Cease cutting asparagus toward the last of the month and let the shoots grow. Tomato plants will need to be staked to keep the fruit off the ground. Stir the ground well after each rain.

July—Cauliflowers which have begun to head need to have a few leaves bent over the flowers to protect them from the sun. Sweet potato tops should be moved about in cultivating to keep them from rooting at the joints. Cultivate now to conserve the moisture and enable the plants to grow continuously throughout the dry period of summer.

August—Cut all weeds in the fence corners to keep them from going to seed and re-seeding the garden. Thin the late sown crops and thoroughly cultivate the celery. Get the hotbeds ready for early winter use. The onions should be ready now for gathering, and should be well dried and stored for winter use.

September—This is the month when the celery, cabbage and cauliflower are making their most vigorous growth and they should be well cultivated; the celery will need to have the leaves drawn up about the stem and some shade provided for the lower part of the leaf stalks. Toward the latter part

of the month blanching should begin. Sow the seed of crops to be wintered over for early spring use.

October—The blanching of celery should now be well under way and the tops will need protection with a covering of straw on cold nights. During the latter part of the month the celery may be dug up and planted in boxes or in a dark corner of the cellar for winter use. All root crops which have not already been dug up and stored should be looked after this month. Lettuce which may be wanted for winter use should be planted this month. Rhubarb and asparagus, if wanted for winter use, should be dug up and either covered where it stands on the ground or stowed away in a shed or cold cellar for a month or two, when it may be taken into a warmer place and will be fit for use in a month or so, according to the temperature.

November—The stalks of asparagus should be cut off; and as asparagus sometimes becomes a weed from the seed dropping it is better to burn the stems if there are seed on them. Spread a dressing of old manure three or four inches thick on the asparagus bed. Whenever it is practicable all empty ground should be dug or plowed this month.

December—During this month one can look over the successes and failures of the season's work and make plans for next year. Root crops stored in pits will need a thick coat of litter and soil spread over them to protect from the hard freezes. Spinach crop in the ground should also have a covering of litter or straw. Manure and compost heaps should be turned frequently to hasten the process of fermentation and be ready for next season's use. Snow that accumulates on the hotbed sash should be removed, as the plants are deprived of light and the melting of the snow may cause ice to form in the

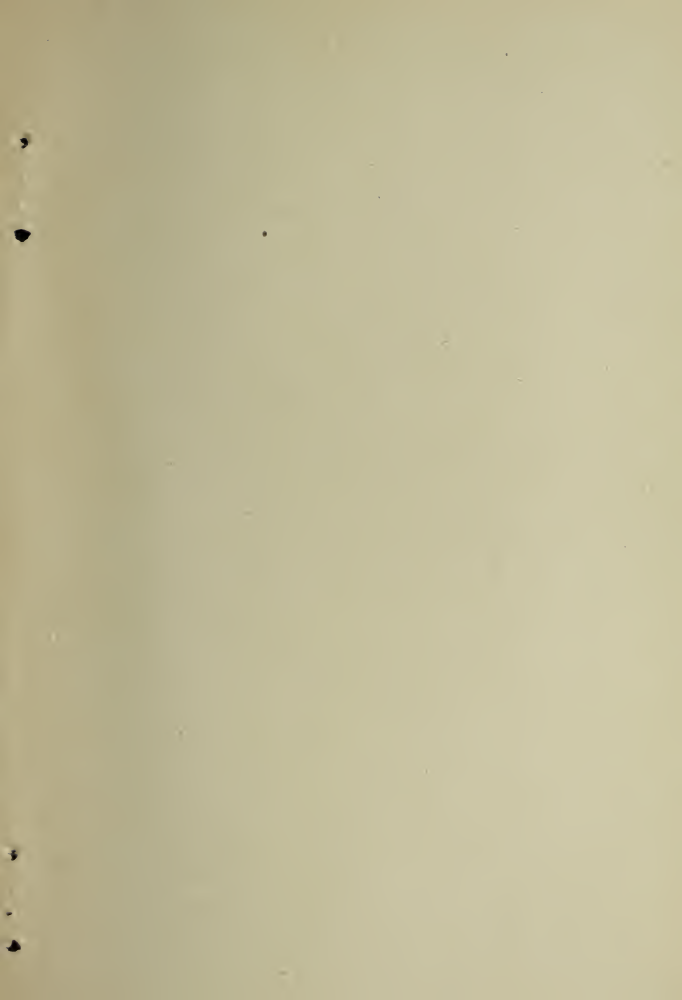
cracks between the sash and cause difficulty in airing the beds. All rubbish in the garden which was left after harvesting the season's crops should be cleaned up.

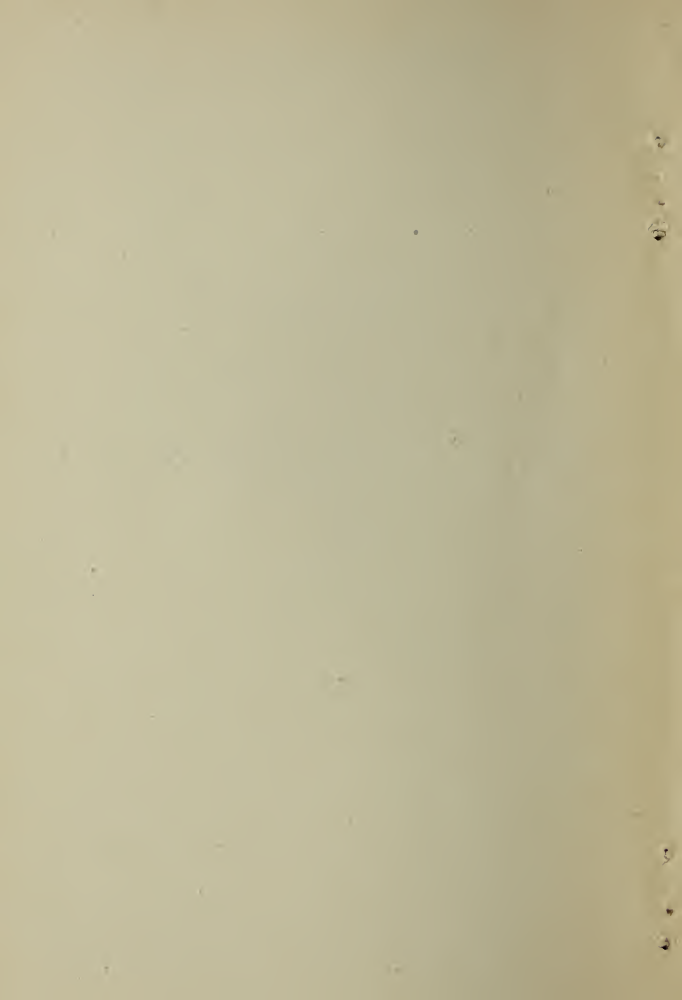


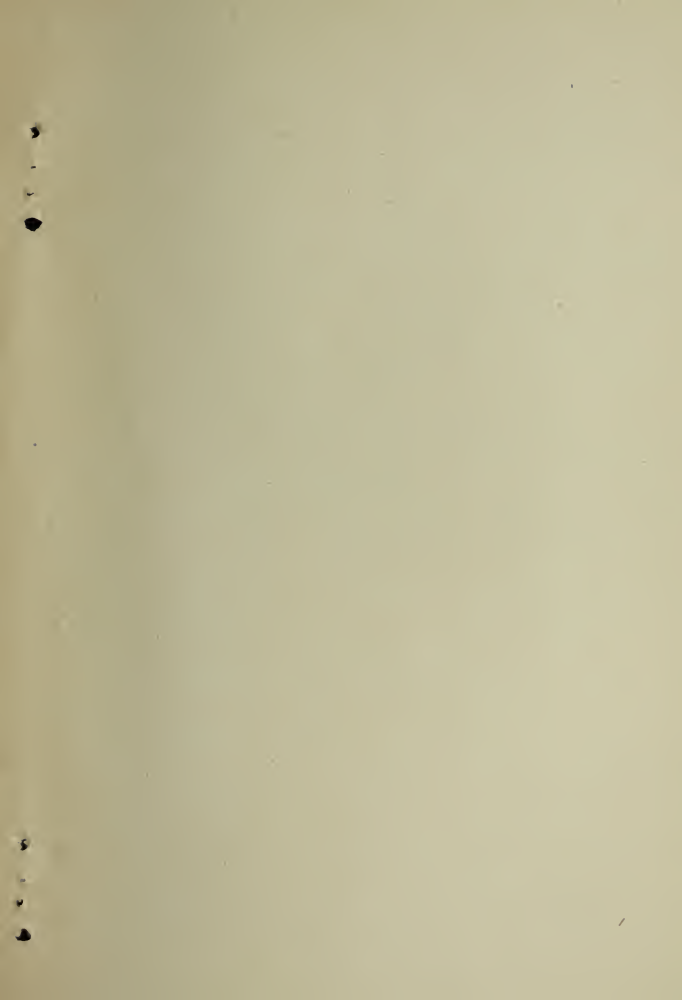
CONTENTS.

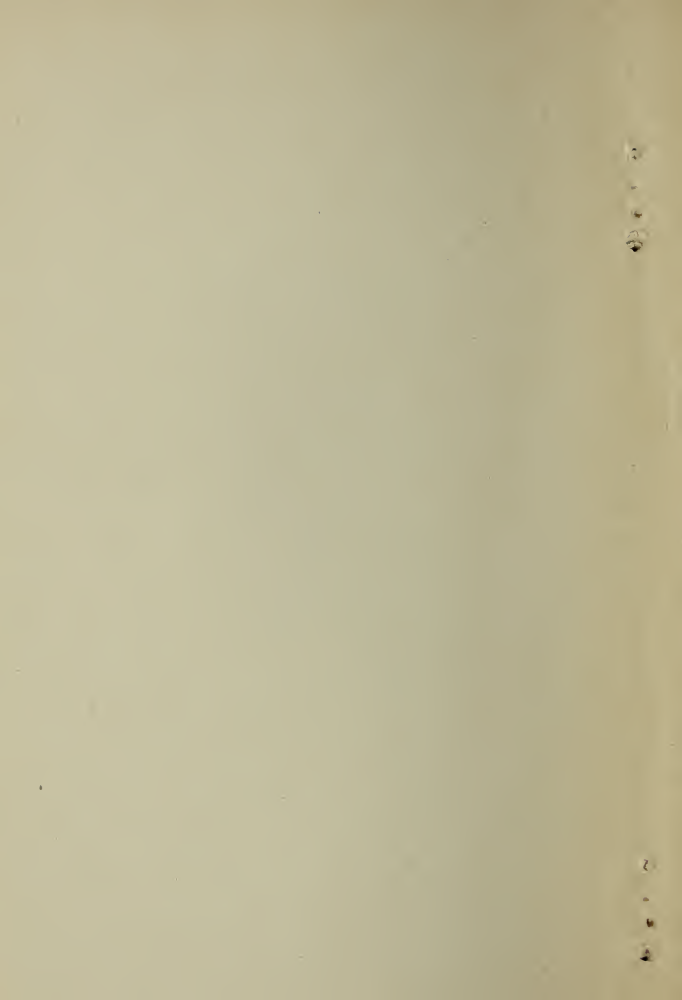
THE SOIL—	Page
In General	6
Soil Water	8
Makeup of Soils and Subsoils	9
Drainage	11
Fall Plowing	12
Tillage	13
Rotation of Crops	14
Fertilizing	15
Laying Out the Garden	18
Hotbeds and Coldframes	19
 GARDEN SEEDS—	
Longevity of Seeds	23
Testing of Seeds	23
 GARDEN CROPS—	
Asparagus	24
Bean	28
Beet	29
Cabbage	30
Carrot	31
Cauliflower	32
Celery	35
Corn	38
Cucumber	38
Eggplant	39
Ginseng	40
Horseradish	41
Kale	42
Kohlrabi	42
Leek	44
Lettuce	44
Musk Melon	45

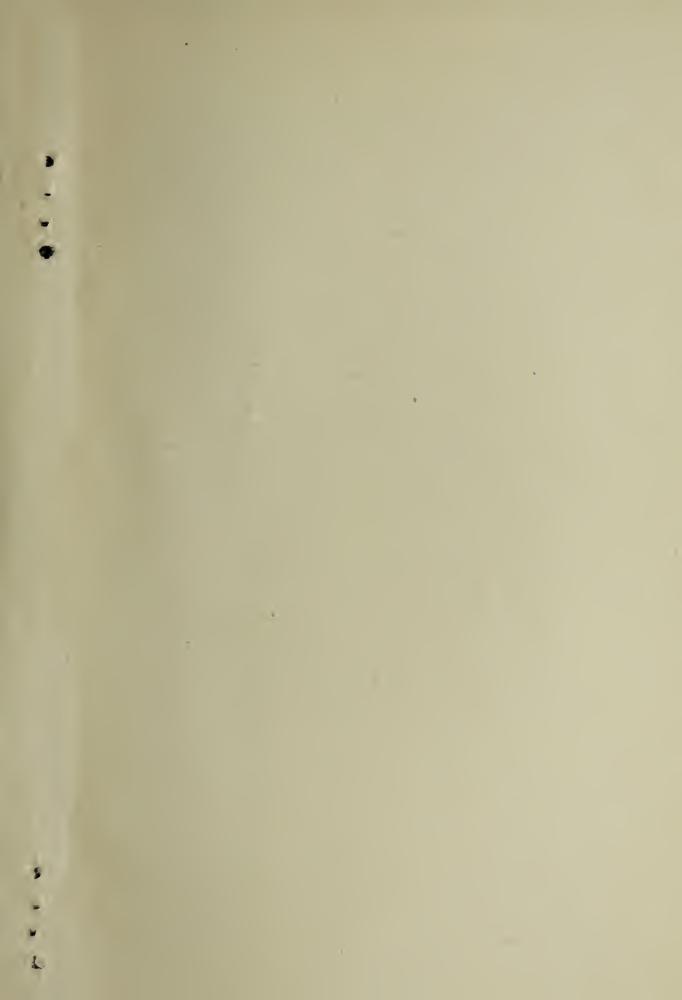
	Page
Onion	46
Okra, or Gumbo	46
Parsley	46
Parsnip	47
Peas	47
Pepper	48
Radish	48
Rhubarb	49
Salsify, or Oyster Plant	50
Squash	50
Spinach, or Spinage	50
Sweet Potato	51
Tomato	51
Turnip	52
Water Melon	52
Monthly Planting Calendar	52













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